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Reed et al.

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[54] COMPUTER-BASED COMMUNICATION SYSTEM AND METHOD USING METADATA DEFINING A CONTROL STRUCTURE

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Related U.S. Application Data

[63] Continuation-in-part of Ser. No. 609,115, Feb. 29, 1996.

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[52] U.S. Cl. 395/200.31; 395/200.42; 395/200.58; 395/200.72; 395/200.74; 707/10; 707/203; 707/204

[58] Field of Search 395/200.3-200.33, 395/200.42, 200.46-200.49, 200.57-200.59, 200.62, 200.72-200.74, 702-703; 707/200-204, 100-103, 10

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Primary Examiner—Krisna Lim

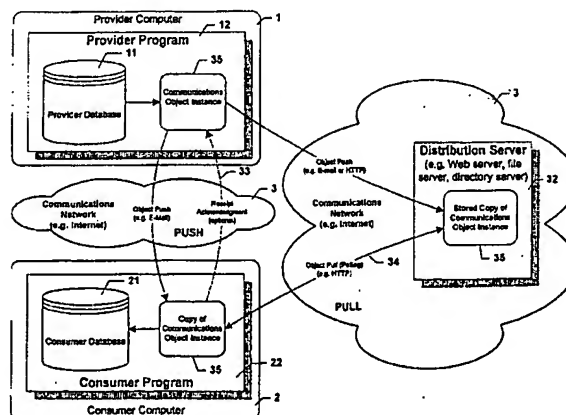
Assistant Examiner—Bharat Barot

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[57] ABSTRACT

An automated communications system operates to transfer data, metadata and methods from a provider computer to a consumer computer through a communications network. The transferred information controls the communications relationship, including responses by the consumer computer, updating of information, and processes for future communications. Information which changes in the provider computer is automatically updated in the consumer computer through the communications system in order to maintain continuity of the relationship. Transfer of metadata and methods permits intelligent processing of information by the consumer computer and combined control by the provider and consumer of the types and content of information subsequently transferred. Object oriented processing is used for storage and transfer of information. The use of metadata and methods further allows for automating may of the actions underlying the communications, including communication acknowledgements and archiving of information. Service objects and partner servers provide specialized data, metadata, and methods to providers and consumers to automate many common communications services and transactions useful to both providers and consumers. A combination of the provider and consumer programs and databases allows for additional functionality, including coordination of multiple users for a single database.

126 Claims, 47 Drawing Sheets



program 12 or consumer program 22 themselves. Data persistence control is particularly relevant to external file data. With the appropriate file creation privileges, data exchange methods can control the creation, modification, and deletion of external files on the user's computer system. These files can be used for many purposes, including the storage of message attachments, web helper files, log files, troubleshooting files, and files created by or intended for use by other software programs in the user's local or network computing environment. Access control and data security enforcement for these files, including encryption and authentication of individuals or communications objects requesting access, can be handled in the same manner as internal data. The ability to access and manage external file storage is particularly valuable in conjunction with the use of attachment elements. Attachment elements allow a provider to store the specification for a file or files as a specific type of communications object element 143 which receives special processing during the communications object generation and transmission routine. This is shown as step 546 in FIG. 12. After the communications object itself is generated for transmission, any attachment element it contains is processed to determine the file, system object, or other attachment it specifies to attach to the transmission. Such attachments can be encoded in MIME, BinHex, UU encoding, or other attachment encoding format as described above. When the communications object bearing the attachment is received by the consumer program 22, the attachment is stored according to a corresponding receipt method. The attachment can be stored internally as an element 143 in the consumer database 21, or externally in the consumer's file system. File data exchange control can also be combined with notification control. For example, a message element (211, FIG. 4) including a hyperlink to the attachment can also be created for inclusion in a notification report (630, FIG. 13) by the consumer program 22. In this way communications object updates can serve as a powerful means of automatically distributing and indexing one or more external attachment files.

One of its most powerful forms of data exchange control in a communications object system is the ability to automate external data queries and the processing of query result sets. This is because it gives providers a tool to allow consumers quickly and easily set up automated queries against any type of data server maintained by the provider. These queries are easily set up because they can be composed using any data available in the consumer database 21 (subject to the consumer's data access rules, as explained above), so the consumer need only enter any new data required. The queries are easily automated because the data exchange method that executes them can create its own scheduled event instances (117, FIG. 3) to execute future instances of the query. External query control can also be combined with notification control to automate notification depending on the query results. For example, a data exchange method that executes a data query for a stock price can notify the consumer if the new price is a certain dollar amount or percentage amount changed from the previous price.

Data type control is especially useful with external queries. This is because the use of standardized data query languages such as Structured Query Language (SQL) makes it easier for providers to create or consumers to modify routine data queries. SQL and other approaches to standardized data query languages are discussed generally in R. G. G. Cattell, *Object Data Management—Object-Oriented and Extended Relational Database Systems* (1994), which is incorporated herein by reference. In a communications

object system, the specifications for a structured query can be stored as a special type of communications object element 143 called a query element. Query elements receive special processing during the communications object generation and transmission routine. This is shown as step 545 in FIG. 12. After the communications object itself is generated for transmission, it is tested for any query elements. For each query element it contains, the data exchange method associated with the query element is executed to perform the query. This could be a query against the provider database 11, against another local application acting as a server, against a network database server, against a web server, or against any other server capable of query processing. When the query result set is returned, the data exchange method determines what further steps to take. These may include appending the data to the communications object transmission as a file attachment, creating and appending a message object, or otherwise modifying the communications object or its encoding or transmission. Query elements thus provide a powerful extension to a provider's ability to control and customize communications object distribution.

Data persistence, access, and security controls all apply to external data queries as well. Again, a communications object system allows these to be implemented at two levels.

At one level, these can be the same controls that apply to the human operator of the programs 12, 22. For example, the user's ability to read, write, or create new records in a database server can be governed by a user ID and login password controlled by a system administrator. The programs 12, 22 can simply require the same information to be entered manually. Alternatively, the programs 12, 22 could store this information as global preferences that it can submit automatically as part of executing data exchange methods. The programs 12, 22 can then implement their own layer of internal security. This can include the use of system-wide login names and passwords, the implementation of rules 140 controlling data access, and the encryption of sensitive data, all as described above. Data access and security control is particularly useful when data exchange methods employing queries are executed by the consumer program 22 on the behalf of the consumer. Using such controls, a provider is able to select the subset of consumers on a communications network 3 such as the Internet who will have access of some kind to one or more databases or database servers operated by the provider. This control is useful when the provider wishes to charge access fees for the data, to protect the data for competitive or security reasons, or to monitor or track access to the data.

By being able to control the exchange of external system data, file data, and data available via external queries in addition to internal data, the programs 12, 22 can automate many routine information transactions on data communications networks. This can produce a vast savings in the human labor normally required to exchange such data. The present invention is able to further increase this labor savings by automating the processing of such data once it has been exchanged. As with other data exchange operations, this is accomplished through the use of data exchange elements 143, data exchange methods 141, and message objects 110. Any data exchange method can produce a message object 110 that can call itself or another method or methods for processing the contents of the message object once it is received. As explained above, data exchange methods that call themselves are polymorphic, performing different operations at the provider program 12 than at the consumer program 22. An example of such a method is the SendAck method discussed above. Like any communications object

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IDENTIFIER:
TITLE: Computer-based communication system and method using metadata defining a control structure

Detailed Description Text - DETX (261):

Data persistence, access, and security controls all apply to external data queries as well. Again, a communications object system allows these to be implemented at two levels. At one level, these can be the same controls that apply to the human operator of the programs 12, 22. For example, the user's ability to read, write, or create new records in a database server can be governed by a user ID and login password controlled by a system administrator. The programs 12, 22 can simply require the same information to be entered manually. Alternatively, the programs 12, 22 could store this information as global preferences that it can submit automatically as part of executing data exchange methods. The programs 12, 22 can then implement their own layer of internal security. This can include the use of system-wide login names and passwords, the implementation of rules 140 controlling data access, and the encryption of sensitive data, all as described above. Data access and security control is particularly useful when data exchange methods employing queries are executed by the consumer program 22 on the behalf of the consumer. Using such controls, a provider is able to select the subset of consumers on a communications network 3 such as the Internet who will have access of some kind to one or more databases or database servers operated by the provider. This control is useful when the provider wishes to charge access fees for the data, to protect the data for competitive or security reasons, or to monitor or track access to the data.

EXAMINER'S SEARCH NOTES



US006801944B2

(12) **United States Patent**
Motoyama et al.

(10) Patent No.: **US 6,801,944 B2**
(45) Date of Patent: **Oct. 5, 2004**

(54) **USER DEPENDENT CONTROL OF THE
TRANSMISSION OF IMAGE AND SOUND
DATA IN A CLIENT-SERVER SYSTEM**

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(*) Notice: Subject to any disclaimer, the term of this
patent is extended or adjusted under 35
U.S.C. 154(b) by 0 days.

(21) Appl. No.: **09/037,219**

(22) Filed: **Mar. 10, 1998**

(65) **Prior Publication Data**

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(30) **Foreign Application Priority Data**

Mar. 13, 1997 (JP) HEI 9- 59603

(51) Int. Cl.⁷ **G06F 15/16; G06F 15/173**

(52) U.S. Cl. **709/229; 709/217; 709/226;
709/235**

(58) Field of Search **709/200, 219,
709/203, 216, 241, 232, 233, 234, 235,
217, 226, 229; 714/6; 707/501.1; 370/229-240**

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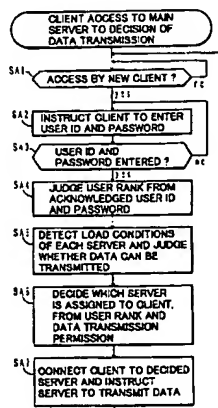
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(57) **ABSTRACT**

A server system having a main proxy server and a mirror
server, wherein the main proxy server includes a unit for
acknowledging an access by a user; a detecting unit for
detecting the conditions of the main proxy server and the
mirror server; and a judging unit for judging, from the
conditions of the main proxy server or the mirror server
detected by the detecting unit, whether data is to be trans-
mitted to the user from the main proxy server or from the
mirror proxy server; and a transmitting unit for transmitting
data to the user.

6 Claims, 6 Drawing Sheets



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DOCUMENT- US 6801944 B2
IDENTIFIER:
TITLE: User dependent control of the transmission of image and sound data in a client-server system

Brief Summary Text - BSTX (15):

A data access fee may change with the type of data. For example, an access fee for both MIDI data and image data is expensive, whereas an access fee for MIDI data only is low. There is a user need of receiving desired data within an allowable amount of money.